

CLAIMS

What is claimed is:

1. A method for reading magnetic memory, the magnetic memory including a plurality of magnetic elements, the method comprising:

5 (a) determining a first resistance of at least one of the plurality of magnetic elements; and

(b) disturbing the at least one of the plurality of magnetic elements;

(c) determining a second resistance of the at least one of the plurality of magnetic elements while the at least one magnetic element is disturbed, the first resistance
10 of the plurality of magnetic elements being determined when the at least one magnetic element is not disturbed; and

(d) comparing the first resistance to the second resistance.

2. The method of claim 1 wherein the disturbing step (b) further includes the
15 step of:

(b1) applying a disturb magnetic field to the at least one of the plurality of magnetic elements.

3. The method of claim 2 wherein the second resistance determining step (c) further includes the step of:
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(c1) determining the second resistance while the disturb magnetic field is applied,

the first resistance of the plurality of magnetic elements being determined in the absence of the disturb magnetic field.

4. The method of claim 2 wherein the plurality of magnetic elements has at least a first state and a second state, wherein the comparing step further includes the step of:

(d1) determining whether the at least one magnetic element is in the first state or the second state based on whether the first resistance is higher than the second resistance.

5. The method of claim 2 wherein each of the plurality of magnetic elements includes a first end and a second end and wherein the first resistance determining step (a) further includes the steps of:

(a1) providing a current through the at least one magnetic element; and

(a2) measuring a voltage at the first end of the magnetic element, the first end having a potential that is higher than the second end.

6. The method of claim 5 wherein the magnetic memory further includes a sample and hold circuit and wherein the voltage measuring step (a2) further includes the step of:

(ai1) using the sample and hold circuit to sample and hold the voltage.

7. The method of claim 6 wherein the second resistance determining step (c)

further includes the steps of:

- (c1) providing the current through the at least one magnetic element; and
- (c2) measuring a first voltage at the first end of the magnetic element.

5 8. The method of claim 7 wherein the comparing step (d) further includes the step of:

- (d1) using the sample and hold circuit to access the voltage to compare the voltage to the first voltage.

10 9. The method of claim 2 wherein the first resistance measuring step (a) further includes the steps of:

- (a1) providing a voltage across the at least one magnetic element; and
- (a2) measuring a current through the magnetic element.

15 10. The method of claim 1 wherein the plurality of magnetic elements further includes a plurality of magnetic tunneling junction stacks.

11. A magnetic memory comprising:

a plurality of magnetic elements for storing data;

20 means for disturbing at least one of the plurality of magnetic elements;

means for determining a first resistance of at least one of the plurality of magnetic elements without the at least one magnetic element being disturbed and for determining a second resistance while the at least one magnetic element is disturbed; and

means for comparing the first resistance with the second resistance.

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12. The magnetic memory of claim 11 wherein the disturbing means further include:

means for applying a disturb magnetic field.

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13. The method of claim 12 wherein the resistance determining means further include:

means for determining a first resistance of at least one of the plurality of magnetic elements without the disturb magnetic field and for determining a second resistance in the presence of the disturb magnetic field.

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14. The magnetic memory of claim 12 wherein the resistance determining means further includes a sample and hold circuit.

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15. The magnetic memory of claim 12 wherein the disturb magnetic field applying means further includes at least one conductive line.

16. A magnetic memory comprising:

a plurality of magnetic elements:

at least one conductive line for carrying at least one current; and

a sample and hold circuit coupled with at least one of the plurality of magnetic
5 elements, the sample and hold circuit for holding a first resistance of at least one of the
plurality of magnetic elements, and for sampling a second resistance of the at least one
magnetic element, the second resistance being measured while the at least one magnetic
element is disturbed, the first resistance being measured while the at least one magnetic
element is not disturbed;

10 a compare circuit for comparing the first resistance and the second resistance are
compared to determine a logical state of the at least one of the plurality of magnetic
elements.

17. The magnetic memory of claim 16 wherein the at least one magnetic element
15 is disturbed using a disturb magnetic field and wherein the at least one current further
includes at least one disturb magnetic field current for generating the disturb magnetic field.

18. The magnetic memory of claim 17 wherein the plurality of magnetic
elements includes a plurality of magnetic tunneling junction stacks.

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